

REMARKS

Claims 9-11 are currently active.

Claim 9 has been amended. Antecedent support for these amendments is found in the figures and page 13, lines 11-16. These changes are believed consistent with the Examiner's comments in the last Office Action in the "Response to Arguments" section.

The Examiner has rejected Claim 9 as being anticipated by JP 63-129078. JP 63-129078 utilizes solidification of liquid silicon metal to form a joint between two non-oxide ceramic tubes. JP 63-129078 is inherently a different joining process than applicants' claimed invention. Applicants' joining occurs by growing silicon carbide molecules into a structural ceramic joint which is also chemically inert. Solidified silicon metal is extremely brittle and chemical reactive. These are very undesirable features for a joining material. Applicants avoid this by claiming "preparing a slurry made of a preceramic polymer and filler material in an inert atmosphere". Furthermore, in view of the joining of tapered cylindrical bodies in JP 63-129078, applicants have imposed restrictions on the angle relationship between male and female tapers in Claim 9. Accordingly, Claim 9 is not anticipated by JP 63-129078.

The Examiner has rejected Claim 9 as being anticipated by JP 57-167083.

JP 57-167083 utilizes yet a different process known as sintering to achieve joining. This has been presented before as a different process than applicants' claimed invention. However, the claimed process develops stronger joints at lower temperature than JP 57-167083 which will ultimately require high temperature to achieve joint strength. Furthermore, in view of the joining of tapered cylindrical bodies in JP 57-167083, applicants' claimed invention restricts the angle relationship between male and female tapers. Accordingly, Claim 9 is not anticipated.

The Examiner has rejected Claims 9-11 as being unpatentable over JP6-256067 in view of DiChiara.

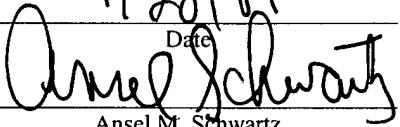
DiChiara, Jr. - 6,494,979 is for bonding only oxide ceramics (DiChiara Jr., column 2, lines 21, 27, 29-31, 39, 40, 43, 46, 48, 52 and column 8 lines 36-64). There is no mention of controlling joint thickness by tapering. There is only interest in mitering to increase the bonding area which as stated previously is not important. Therefore, this patent is not relevant to Claims 9-11, since they involve different materials and most importantly do not use tapering to control joint thickness.

In Shimpo - JP 6-256067, only the development of a joining compound is addressed with no regard to the joint geometry. In particular, joint thickness is not addressed. Joint thickness, substantially impacts the amount of joint shrinkage and hence, joint strength and the porosity. Porosity effects the degree of hermiticity, which is also not addressed in JP 6-256067. In JP 6-256067 there is no information related to a joint design and nothing specifically on what is a suitable taper. A joint thickness has to be developed for each joining material and for each ceramic to be joined. Combining DiChiara joining method, which does not specify a joint thickness; with Shimpo's compound has almost no chance of achieving high joint strength. The applied art of record does not make obvious Claims 9-11.

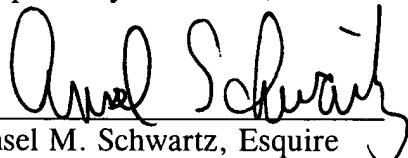
On page 5 of the Examiner's Office Action, paragraph 2, the Examiner makes a conclusion that has no supporting data. The line, "thus the slurry applied to the end faces includes silicon carbide powder having particle size in the range between 20 nm and 35 μm , as claimed in Claim 10". JP 6-256067 used silicon carbide powder with an average grain size diameter of $2\mu\text{m}$. How is $2\mu\text{m}$ the average grain diameter of 20 nm and 35 μm ? Generally when silicon carbide powder is purchased at a specific grain size there is a very narrow range over which the size varies, for example, if $2\mu\text{m}$ is the average then the smallest diameter may be $1.5\mu\text{m}$ and the largest diameter may be $2.5\mu\text{m}$. After two decades of buying powders, applicant Mako has never seen a large spread for a specific average particle size.

Accordingly, Claim 9 is patentable over the applied art of record.

In view of the foregoing remarks, it is respectfully requested that the outstanding rejections and objections to this application be reconsidered and withdrawn, and Claims 9-11, now in this application be allowed.

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